

Dissolved Oxygen Levels in Coastal Waters

Background

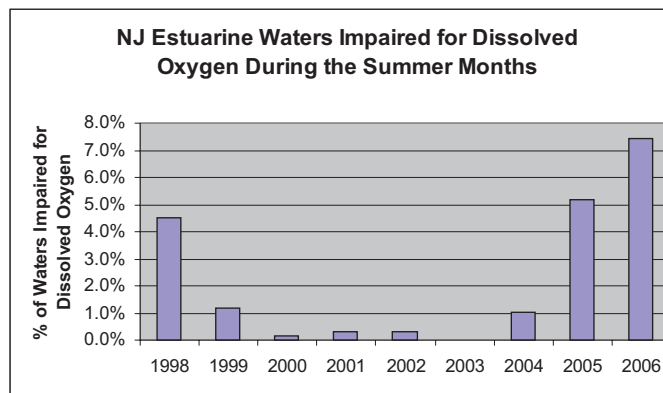
Dissolved oxygen is a fundamental requirement for the maintenance of balanced populations of fish, shellfish, and other aquatic organisms. The nature and extent of the organism's response to low oxygen concentrations depends on several factors including the concentration of oxygen in the water, the duration of the organism's exposure to reduced oxygen, and the age and physiological conditions of the organism.

Because dissolved oxygen is so important to marine life, New Jersey has established surface water criteria for oxygen levels in marine waters. The surface water criterion is five milligrams per liter for ocean waters and four milligrams per liter for estuarine waters. Dissolved oxygen concentrations below two milligrams per liter are considered lethal to aquatic life, while concentrations above two but below the four or five milligrams per liter designation may support aquatic life, but warrant further study. However, prolonged periods of exposure to below optimum conditions may stress some aquatic life.

Trend

Assessment of dissolved oxygen in ocean waters began in 2002 and revealed that 70% of the state's ocean waters (bottom waters only) did not meet the state's surface water criterion. DEP, EPA and Rutgers University are planning studies to better understand ocean dissolved oxygen levels and the factors influencing them.

The chart below shows the trend with regard to estuarine waters assessed for summer dissolved oxygen conditions over a nine-year period. The impairment dropped from 1998 through 2003 and then increased from 2004 through 2006. No clear reason can be found for this impairment change, but variation year to year can be caused by a variety of factors, such as the weather preceding the sample collection, water temperature, water quality parameters (e.g., nutrients, chlorophyll a, etc.), and the time of sample collection. To look for any long term changes and their causes, more continuous monitoring of dissolved oxygen is needed to understand the daily fluctuations and how it relates to weather conditions and water quality.



Outlook and Implications

The trend for New Jersey's estuarine (bay) waters shows a high degree of variability from year to year. The factors responsible for long-term changes

in dissolved oxygen levels are poorly understood. In recent years, data on the health of the benthic community in New Jersey's estuarine waters has been collected to complement ongoing dissolved oxygen measurements and provide a more complete picture of the health of the state's estuarine waters.

A long-term assessment of New Jersey's ocean waters is not available at this time (only year 2002 data has been assessed). As with estuarine waters, the factors responsible for long-term dissolved oxygen trends are not well understood. Further study (as described above) of these factors and their impact on ocean ecosystem health is clearly warranted.

It is hoped that the new stormwater rules adopted by New Jersey will improve the quality of New Jersey's ocean and estuarine waters by reducing the potential for growth of certain algal species that respond to excess nutrients carried by stormwater. When these nutrients are depleted by an algal bloom, the algae then die and their decomposition results in low oxygen levels in the waters.

More Information

Additional information can be obtained by contacting DEP's Water Monitoring and Standards at (609) 748-2000 or by visiting www.nj.gov/dep/wms/bmw.